



Alaska Conservation Foundation

Office of Environmental Information (OEI) Docket (Mail Code: 2822T)
Docket # EPA-HQ-ORD-2012-0276
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, DC 20460

Re: Comments on An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska – External Review Draft May12 (Docket # EPA-HQ-ORD-2012-0276)

To Whom It May Concern:

I appreciate the opportunity to comment on the Draft Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska (Assessment). I find it to be a thorough document, based on clear articulation of issues and methodologies. The Assessment is a thorough investigation of the impacts of large-scale mining in the Bristol Bay watershed. The comprehensive team of experts who researched and wrote the Assessment provided a comprehensive report on ecological resources and related economies of Bristol Bay. The report relies on sound science, including industry reports, Pebble Limited Partnership (PLP) data, peer reviewed publications, agency reports and non-governmental research.

The Assessment properly characterizes the nature of the Bristol Bay fishery:

- Bristol Bay supports the world's largest sockeye fishery, with approximately 46% of the average global sockeye and a 20 year average of approximately 37.5 million fish.
- Bristol Bay is home to world's fourth largest wild Chinook salmon run, as well as healthy wild coho, pink and chum salmon runs
- Bristol Bay's fishery is inherently tied to high quality aquatic habitats, which exist because the ecosystem and wetlands remain intact with little development
- The review accurately characterizes both the economic and cultural importance of Bristol Bay – from the jobs associated with the fishery to the subsistence resources of the broader Bristol Bay ecosystem.

The Assessment also provides substantial information to support the conclusion that even under a best-case, No Failure scenario, fisheries would be adversely affected by large scale metallic sulfide mining.

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The Assessment's hypothetical mining scenario is an accurate representation of the potential for mining in the Bristol Bay watershed and clearly draws on the best available literature and information on the mineral and ecological resources, including PLP's own extensive data set.

I provide here some constructive comments. First, while the Assessment appropriately refers to the "pure" or "clean" water of the region (see section 2 "Characterization of the Current Condition") it would be worth stating that the waters are so clean that they far exceed virtually all water quality standards set by the state of Alaska, and are so pure that aquatic life will be highly susceptible to any increase in metals.

Further, EPA appropriately addresses mill waste tailings, including a section on why paste tailings will not be an option. The assessment might also benefit from a discussion of how other water treatment options could affect the quality of waters downstream even under a best-practices, No Failure scenario.

Additionally, I find a few aspects of the Assessment concern us. Broadly speaking I have found that in many cases the Assessment underestimates the potential risk to Bristol Bay's fishery.

- While the Assessment accurately characterizes the nature and location of the deposit, I am concerned that the 6.5 billion ton maximum mine scenario used in the assessment is significantly smaller than the total 10.78 billion ton resource estimate of the Pebble Prospect as described by Northern Dynasty in their 2011 Wardrop Report. The Assessment clearly underscores, utilizing the best available data, including that from the PLP, that the wastes from mining the Pebble deposit will likely generate acid, which will dissolve copper and pose serious risks to Iliamna Lake, aquatic habitat, and the waters of Bristol Bay. By using the lower resource estimate, the Assessment underestimates the potential long-term risk to fish.
- Mine scenarios also underestimate cumulative impacts that would occur with the build out of a single mine, as the study scope was limited and did not include impact assessment of power, port, transportation, and human infrastructure development that would likely occur.
- The failure scenarios are conservative in that they consistently underestimate the maximum level of impact that could be expected in a worst-case failure scenario. As a result, the impacts from a worst-case failure are understated by the findings of the Assessment. While it is not possible to say that a worst case failure, or that the failure scenarios of the Assessment will occur, the Assessment does identify the type and magnitude of failures that might occur over the long (perpetual) life of the mine site. Based on the performance record of existing mines there is a significant chance that one of more of these failure scenarios will happen.



Geochemical Characterization

Regarding geochemical characterization, the Assessment notes that leaching test results “are uncertain predictors of the actual composition of leachates from tailings impoundments, tailings deposited in streams and their floodplains, and waste rock in piles (p. 8-11).” While it is true that the results from laboratory tests and mine leachate under operational conditions might not match exactly, general characteristics and trends can be captured by the tests. In some of the other discussions of uncertainty, the Assessment notes general trends (e.g., “It is clear that they [tailings and product concentrate deposited in spawning and rearing habitat] would be harmful to salmonid eggs, fry, or sheltering juveniles... (p. 8-11)], yet no such statement is made regarding the quality of mine waste leachate. Results from PLP’s Environmental Baseline Document demonstrate that leachate from pre-Tertiary waste rock, which would comprise approximately 20% or more of the total waste rock and much of the pit walls, would be acidic and contain concentrations of metals well in excess of aquatic life criterion values.

The final assessment could provide a range of water quality conditions under the examined Failure scenarios. Although the need for treatment is mentioned extensively in the Assessment, the general type of treatment needed is not discussed. The leach test results do indicate that metals removal will be necessary, and because of the low baseline concentrations in streams and the lack of allowed mixing zones, the discharge of treated effluent will need to protect aquatic life in surface waters. The assessment could explicitly discuss, at least in a general sense, the possible types of treatment needed. The Assessment might also perform an assessment of how natural stream waters will change from the discharge of treated mine water under a No Failure scenario. In particular, water treatment plant effluent hardness values would be expected to significantly increase the level of total dissolved solids in Bristol Bay watershed streams near proposed discharge locations, and the impacts of these changes, even though they might meet water quality standards, are not clear.

Fishery Hazards

Regarding risks to the fishery, the laboratory toxicity tests for copper under-estimate impacts to sensitive macroinvertebrates and algae and under-represent the effects of copper toxicity on salmon, especially olfaction dependent behaviors such as spawning, migration, and avoidance of predators. The results of a recently published study by McIntyre et al. (2012)¹ add to the growing body of literature regarding the impacts of sub-lethal concentrations of dissolved copper to juvenile coho salmon. The study concludes that low levels of dissolved copper (5-20 mg/L) disrupts olfactory processes and decreases the ability of juvenile coho smolt (*Oncorhynchus kisutch*) to detect predators, thus increasing mortality by predation (McIntyre et al. 2012). The final assessment can reference this study and modify its discussion accordingly.

¹ McIntyre, J, Baldwin, D.H., Beauchamp, D.A., and Scholtz, N. (2012). “Low Level Copper Exposures Increase Visibility and Vulnerability of Juvenile Coho Salmon to Cutthroat Trout Predators.” *Ecological Applications*. Forthcoming.



Finally, most laboratory tests used to set standards do not evaluate the combined low hardness and low dissolved organic carbon conditions that are common in Bristol Bay headwater streams. This combination makes aquatic biota even more sensitive to increased metal concentrations, and this point could be added to the assessment.

Water Quality/Hydrology

When evaluating water quality and hydrologic impacts of mine development, the Assessment evaluates impacts during average flow conditions. Since natural flows have large seasonal variations, flow reductions resulting from a mine can be substantially more severe than predicted by this averaging approach. For example, the degree of dilution from receiving waters will vary seasonally, so that the assessments based on averages are almost certain to underestimate water quality impacts under low flow conditions.

Seismic Risk

The Assessment does a good job of noting earthquakes as a potential trigger for failure over the short or long-term. However, in box 4-3 describing the seismic environment of Bristol Bay, they overstate the strength of our current scientific knowledge about seismic risk in the area, implying that the lack of evidence for past earthquakes is evidence that no such earthquakes have ever occurred. This section fails to reference the most current and appropriate publication on the largest nearby fault by Koehler and Reger 2011, Reconnaissance Evaluation of the Lake Clark Fault, Tyonek Area, Alaska.² This publication makes clear seismic uncertainties: "*The paleoseismic history of the [area near Pebble] remains unknown.*"

Even with these underestimations of risk, the Assessment soundly documents that large-scale, metallic sulfide mining in salmon headwaters, could have unacceptable adverse impacts to the Bristol Bay watershed and its world class fishery. Given the historical decline of salmon in the Northern Hemisphere, combined with the historical impacts of large-scale mining on biodiversity, water quality, and public health, the record clearly demonstrates the need for protective action for Bristol Bay.

I urge USEPA to utilize its authority granted under Section 404(c) of the Clean Water Act to restrict discharge of dredged or fill materials in the Pebble Deposit.

² R. D. Koehler, R. D. Reger, 2011: Reconnaissance Evaluation of the Lake Clark Fault, Tyonek Area, Alaska; DGGs Preliminary Interpretive Report 2011-1.



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I appreciate the opportunity to comment on this Assessment. In addition to the general comments provided in this letter, I also direct your attention to the technical review comments submitted the following for the record of the Assessment:

- David Chambers, PhD, (Center for Science and Public Participation) -
- Kendra Zamzow (Center for Science and Public Participation)
- David Albert (The Nature Conservancy)
- Cam Wobus, PhD (Stratus Consulting)
- Ann Maest, PhD (Stratus Consulting)
- Sarah O'Neal (Fisheries Research and Consulting)
- Bretwood Higman, PhD (Groundtruth Trekking)
- Tim Troll (Bristol Bay Heritage Land Trust)

Thank you for the opportunity to comment on the draft Watershed Assessment.

Sincerely,

Samuel Snyder, PhD
Director, Bristol Bay Watershed and Fisheries Protection Campaign